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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	)	
John Liu et al.	)	Examiner George P. Wyszomierski
Serial No. 09/821,291	)	Group Art Unit 1742
Confirmation No. 3184	)	Attorney Docket No. 96-2045
Filed March 29, 2001	)	Response Under 37 CFR 1.116 Expedited Procedure
For Aluminum Alloy Extrusions Having A Substantially Unrecrystallized Structure	)	Examining Group 1700

APPEAL BRIEF

August 8, 2003

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is in support of the Notice of Appeal filed April 16, 2003 in the above-identified patent application. The Notice of Appeal appeals the final rejection of Applicants' claims 1-10, 27, and 28. An oral hearing is requested.

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I. REAL PARTY INTEREST

John Liu, Gary H. Bray, David A. Lukasak, and Robert C. Pahl are the only inventors of the invention described and claimed in the above-identified application. These inventors have assigned all rights, title, and interest in the invention of the application to Alcoa Inc. Alcoa Inc. is the real party in interest in this appeal.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to the Applicants or the Applicants' legal representation which will directly affect or be directly affected by, or have a bearing on the Board's decision in this pending Appeal.

III. STATUS OF CLAIMS

Claims 11-26 were cancelled in an amendment dated March 29, 2001. Claims 1 and 11-12, as submitted in the Amendment of November 4, 2002 are pending. The claims which numbered as claims 11 and 12 in the amendment filed November 4, 2002 were renumbered as claims 27 and 28, respectively, under 37 C.F.R. 1.126.

Claims 1-10, 27 and 28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Karabin et al. (U.S. Patent 5,865,914). Claims 1-10, 27, and 28 are pending in this application and are the subject of this Appeal. Claims 1-10, 27, and 28, as appealed, are reproduced in attached Appendix A.

IV. STATUS OF AMENDMENTS

No amendments were filed after final rejection.

V. SUMMARY OF THE INVENTION

The invention, as set forth in appealed claims 1-10, 27, and 28, is a method of extruding structural members that have a combination of high strength and toughness. The method provides an alloy comprising about 3.6 to about 4.2 wt. % copper, about 1.0 to about 1.6 wt. % magnesium, about 0.3 to about 0.8 wt. % manganese, and about 0.05 to about 0.25% zirconium. The balance is substantially aluminum, incidental elements, and impurities. Prior to extruding the alloy at a temperature within about 500° to about 750°F to form an extrusion, the alloy is homogenized at a temperature between 855° and 880°F. The extrusion is then solution heat treated and quenched before making a structural member therefrom. The method could further include stretching of the extrusion between about 1 to about 10 %, with the extrusion

having a longitudinal yield strength of at least about 50 ksi and a longitudinal tensile ultimate strength of at least about 70 ksi.

VI. ISSUES

The following issues are presented by this appeal.

1. Are claims 1-10,27, and 28 directed to non-anticipated subject matter in view of the teachings of Karabin.

2. Are claims 1-10,27, and 28 directed to non-obvious subject matter in view of the teachings of Karabin.

VII. GROUPING OF CLAIMS

Claims 1-10,27, and 28 stand or fall together. The rejection of these claims is addressed in the arguments set forth below.

VIII. ARGUMENT

Each issue presented for review is addressed hereinafter under the appropriate heading:

(i) 35 D.S.C. § 102.

The Examiner has rejected claims 1-10, 27, and 28 under 35 D.S.C. § 102(b) for purported anticipation by Karabin et al. Specifically, it is asserted that the Karabin patent discloses a process including the steps as recited in claims 1, 27, and 28 (i.e., providing an alloy, homogenizing and extruding at certain temperatures, solution heat treating, and quenching), performed preferably upon a composition as recited in these claims. It is also asserted that with respect to claims 4-10 and 28, the examples of Karabin are stretched approximately 1 %, are preferably unrecrystallized, and, according to Table 3 of Karabin have properties as recited in claim 10. Finally, it is asserted that the homogenizing temperature may be the same in both the Karabin patent and the claimed invention.

Karabin et al. ('914) recites a composition that has lower upper limit and lower limit concentrations than the claimed invention. Karabin et al. states at column 5, lines 42-4:

> ...the unrecrystallized aerospace plate products of this invention include total copper contents ranging from a lower limit of about 3.7 or 3.8 wt. %, to an upper limit of about 4.0 or 4.1 wt. %.

Appellants' claims 1-10, 27, and 28 recite a copper concentration of about 3.6-4.2 %. This copper concentration is neither disclosed nor suggested by Karabin et al.

In addition, Karabin et al. ('914) discloses a method in which the

homogenization is conducted at a higher temperature than the claimed invention. Karabin et al. states at column 5, lines 42-4:

> ...the ingot may then be preheated to homogenize and solutionize its interior structure. A suitable preheat treatment is to heat the ingot to about **880° or 900°F.** It is preferred that homogenization of this invention be conducted at cumulative hold times on the order of about 12 to 24 hours.

Applicants' amended claim 1 and claim 28 recites a homogenization temperature of between about **855° and 880° F.** This homogenization temperature is not disclosed or suggested by Karabin et al. Also, claim 27 does not contain a step whereby homogenization takes place prior to extruding.

Karabin et al. ('914) discloses a method whereby the final step consists of cold working and stretching the plate product. Karabin et al. states at column 6, lines 14-16:

> After quenching, this product is both **cold worked and stretched...**

Appellants' claims 1-3 and 28 **do not** contain a step that consists of cold working and stretching the extrusion. Appellants' claims 4-10 and 27 do not contain a step that consists of cold working the extrusion, but they do contain a step that includes stretching the extrusion. However, unlike the Karabin patent, these steps claim a minimum-maximum stretching limit of about **1 to about 10%.** Furthermore, extrusions cannot be cold worked. Cold working is only meant for sheet and plate structures.

Also, Karabin et al. ('914) discloses a method comprising an alloy having a longitudinal yield strength of 72.5 ksi and a longitudinal-tensile ultimate strength of 78.2 ksi (Table 3, column 10, lines 15-27). Appellants' claim 10 recites a longitudinal yield strength of at least about 50 ksi and a longitudinal tensile yield ultimate strength of at least about 70 ksi. These strengths are not disclosed or suggested by Karabin et al.

For the above reasons, Appellants respectfully request reconsideration of the rejection of claims 1-10,27 and 28 under 35 D.S.C. § 102 (b) for asserted anticipation by Karabin et al.

(ii) 35 U.S.C. § 103.

The Examiner has rejected claims 1-10,27, and 28 under 35 D.S.C. § 103 for purported obviousness over Karabin et al. The Examiner maintains that at least one particular temperature (880 degrees Fahrenheit) is specifically mentioned in both Karabin and the

Applicants' claims, and therefore to perform the Karabin process using a homogenizing temperature within the limitations of the Applicants' claims would have been considered an obvious expedient to one having ordinary skill in the art.

Karabin et al. states at column 5, lines 42-3:

> The ingot may then be preheated to homogenize and solutionize its interior structure. A suitable preheat treatment is to heat the ingot to **about 880° or 900° F.**

Merriam Webster's Collegiate Dictionary defines "about" as "reasonably close to." Applying this definition to the above temperature range, results in the homogenization temperature being reasonably close to 880° or 900° F.

Applicants' amended claim 1 recites a homogenization temperature of **between about 855° and 880°F.** Merriam Webster's Collegiate Dictionary defines "between" as "in the time, space, or interval that separates." Applying this definition to the above temperature range, results in the homogenization temperature as being in the time, space, or interval that separates 855° and 880°F, including the temperatures 855°F and 880°F.

Regardless of the fact that 880°F is specifically mentioned in both Karabin and Applicants' claims, it is not a temperature at which homogenization is claimed to occur in the Karabin patent. Therefore to perform the Karabin process using a homogenizing temperature within the limitations of the instant claims would not have been considered an obvious expedient to one having ordinary skill in the art.

In addition to the above made assertion, the Examiner also asserts that the recited "making a structural member" therefrom would include the cold rolling as recited at Karabin column 6, line 14 or column 10, line 8. Therefore, the Karabin patent discloses a process which would render Applicants' claimed process obvious to one of ordinary skill in the art.

As stated above, extrusions, such as the one disclosed in Applicants' claimed invention, cannot be cold rolled. Cold rolling is meant to be performed on sheet and plate structures, such as the plate product claimed in the Karabin patent. Therefore, the Karabin process does not disclose a process which would render Applicants' claimed process obvious to one of ordinary skill in the art.

For the above reasons, Applicants respectfully request reconsideration of the rejection of claims 1-10, 27, and 28 under 35 D.S.C. § 103 for asserted anticipation by Karabin et al.

IX. CONCLUSION

The matter of claims 1-10, 27, and 28 are not anticipated by, or obvious in view of, the applied prior art for the reasons described above. Therefore, the Examiner's rejection of claims 1-10,27, and 28 under 35 U.S.C. § 102(b) and 35 U.S.C. § 103 should be reversed. The claimed method differs from that of the prior art references in a manner which is not contemplated in the prior art, and cannot be contemplated.

Reversal of the Final Rejection of claims 1-10,27, and 28 is respectfully requested for the reasons set forth herein.

Respectfully submitted,

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X. APPENDIX A

1. A method of extruding structural members comprising:

(a) providing an alloy comprising:

about 3.6 to about 4.2 wt % copper,

about 1.0 to about 1.6 wt % magnesium,

about 0.3 to about 0.8 wt. % manganese,

about 0.05 to about 0.25 % zirconium,

the balance substantially aluminum, incidental elements, and impurities;

(b) homogenizing said alloy at a temperature between about 855° and 880°P prior to extruding said alloy at a temperature within about 500° to about 750°F to form an extrusion;

(c) solution heat treating said extrusion; and

quenching said extrusion before making a structural member therefrom.

2. The method of claim 1 wherein (b) is about 550° to about 650°F.

3. The method of claim 1 wherein (b) is about 600° to about 650°F.

4. The method of claim 1 which further includes:

(c) stretching said extrusion by at least about 1 %.

5. The method of claim 1 which further includes:

(c) stretching said extrusion between about 1 to about 10%.

6. The method of claim 1 which further includes:

(e) stretching said extrusion between 1 to about 8%.

7. The method of claim 1 which further includes:

(e) stretching said extrusion between about 1 to about 3%.

8. The method of claim 1 which further includes:

(c) stretching said extrusion by at least about 1 %, said extrusion having less than about 50% by volume recrystallized after stretching.

9. The method of claim 1 which further includes:

(f) stretching said extrusion by at least about 1 %, said extrusion being substantially unrecrystallized.

10. The method of claim 1 which further includes:

(e) stretching said extrusion by at least about 1 %; said extrusion having a longitudinal yield strength of at least about 50 ksi and a longitudinal tensile ultimate strength of at least about 70 ksi.

27. A method of extruding structural members consisting essentially of:

(a) providing an alloy comprising:
about 3.6 to about 4.2 wt % copper,
about 1.0 to about 1.6 wt. % magnesium,
about 0.3 to about 0.8 wt % manganese,
about 0.05 to about 0.25% zirconium,
the balance substantially aluminum, incidental elements, and impurities;

(b) extruding said alloy at a temperature within about 500° to about 7500P to form an extrusion;

(c) solution heat treating said extrusion;

(d) quenching said extrusion before making a structural member therefrom; and

(e) stretching said extrusion by at least about 1 %.

28. A method of extruding structural members having a combination of high strength and toughness, said method comprising:

(a) providing an alloy comprising:
about 3.6 to about 4.2 wt. % copper,

about 1.0 to about 1.6 wt. % magnesium,

about 0.3 to about 0.8 wt. % manganese,

about 0.05 to about 0.25 % zirconium,

the balance substantially aluminum, incidental elements, and impurities;

(b) homogenizing said alloy at a temperature between to a temperature between about 855° and 880°F prior to extruding said alloy at a temperature within about 500° to about 750°F to form an extrusion;

(c) solution heat treating said extrusion; and

(d) quenching said extrusion before making a structural member therefrom.